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**METHOD AND APPARATUS FOR
BULK FOOD MARKING AND TRACKING**

Field of the Invention

[0001] The present invention is generally directed toward a method and apparatus for tracking the movement of food products from the farm to the ultimate consumer, and is more particularly directed toward tracking food products through all aspects of gathering, processing, and packaging operations for permitting subsequent tracing back through the operations to meet government regulations, commercial accounting requirements, and consumer reporting requirements.

Background of the Invention

[0002] Food producers, distributors, and retailers are increasingly required to implement systems for tracing all aspects of food production from the farm to the ultimate consumer. Much more stringent tracking or tracing requirements are being imposed upon importers of food products, and wholesalers and distributors of such food products, all under the regulatory control of the U.S. Food and Drug Administration (FDA). New and stricter regulations are being imposed under the Bio-terrorism Act of 2002. A recent requirement of the FDA is that systems must be implemented for tracing food products back to their source, preferably back to the farm where the food products were grown. Accordingly, presently available systems must be modified, or new systems designed, in order to meet the regulatory requirements.

Summary of the Invention

- [0003] An object of the invention is to provide an improved method and system for tracking the movement of food products from the farm, through processing and packaging, through the distribution chain from the wholesaler, to the distributor and the ultimate consumer.
- [0004] Another object of the invention is to provide an improved method and system for tracking the movement of food products from the farm, through processing and packaging, through the distribution chain from the wholesaler, to the distributor, to the ultimate consumer.
- [0005] Another object of the invention is to provide a food tracking method and system that includes a centralized database for maintaining centralized ledgers for tracking uniquely identified food products from the farm to the ultimate consumer.
- [0006] Yet another object of the invention is to provide a computerized method and system for tracking liquid or liquid-suspended and other food products through gathering, processing, and packaging steps, in a manner permitting rapid identification of crop pickers, gathering baskets, containers, manufacturers of the baskets and containers, distributors and processors, involved in growing or raising the food products, processing and packaging and distributing and selling the food products, for meeting all governmental, accounting, and informational requirements.
- [0007] With these objects and problems in the prior art in mind, the present invention provides for tracking the manufacture and implementation of food gathering baskets, of pickers who may gather food or of automated equipment used for

picking crops, of containers for moving and shipping the food products, of manufacturers producing the gathering baskets and shipping containers, respectively, and of the movement of food products from one location to another between the farm, processing facilities, and the entire distribution chain. All aspects of the movement of the food products are tracked on a central ledger associated with a centralized database. The central ledger is utilized to provide a permanent record for the tracking of food products from the farm through the conversion thereof into final products for sale. The system further provides means for using the ledger to track the cost of various steps in the food processing chain and distribution system, and for permitting companies to periodically audit the tracking system to ensure the accuracy of the data. Farmers and companies involved in the food processing chain or system may pay a fee to become members of the tracking system, and be provided with means for ensuring that their activities are properly recorded in the centralized ledger. The tracking system provides for means to label all containers involved in the processing, including food gathering baskets, automated picking equipment, and so forth, which are permanently labeled with unique codes that can be scanned to individually identify and track use of the same. Users of this system are provided with means for applying labels to the containers with the unique identifying codes imprinted on the labels. Scanning means are provided to scan labels for obtaining digitized data indicative of the date, time, and user of each container or basket.

[0008] In one embodiment of the invention users of the system are each provided with a unique numbering generator associated with a container label maker, for providing a printed label with a unique number for identifying the container, whereby for each label produced the user's account would be charged. The labels are applied to the containers and/or associated pallets through the entire food processing system. New

tracking labels are applied to pallets loaded with a plurality of relatively small containers, and are applied to relatively large containers when repacked. In this manner, means are provided via scanning, date and time marking the labels, along with other data for tracking and tracing back every step in the food processing system, including the manufacture of containers and food gathering baskets, crop pickers, wholesalers, distributors, and retailers. Container labels are date and time stamped every time there is a change in the utilization of the container, such as when it is empty, filled, emptied, and/or moved from one location to another.

Brief Description of the Drawings

- [0009] Various embodiments of the present invention are described below in association with the drawings, in which like items are identified by the same reference numeral, wherein:
- [0010] Figure 1 is a simplified block diagram showing one embodiment of the invention.

Detailed Description of Preferred Embodiments

- [0011] In one embodiment of the invention, a centralized database is maintained in a computer system for tracking all events from farm to retailer relative to the handling, processing, packaging, and movement of food products. In one aspect of the system, the various producers of food products from farmer to processor, manufacturers of containers and/or food gathering baskets, distributors, retailers, and others involved in the food chain, pay a fee to join a service providing centralized tracking of all processing and distribution of food products from the originating farm to the consumer. Each of the user members are provided with label

makers having unique number generators for printing labels for permanent application to food gathering baskets, shipping containers, and so forth. Labels placed on the containers provide scannable printed information uniquely identifying each container. The labels are then scanned for identifying the manufacturer of the container, the time and date of manufacture, the present location of the container and so forth. When a container is filled with a food product, its label is scanned for identifying the food product, the farm where food product was produced, and the time and date of filling the container. The information is entered into a central ledger.

[0012] Every time a container is moved from one location to another in the food processing chain, its label is scanned for identifying the new location of the container and the date and time of transfer. The user may scan the label with a bar code reader, for example, and the information read is used to update the inventory data associated with the user, and also is transferred for updating a ledger maintained by the centralized computer for tracking all relevant information and movement of the associated food product. All transactions associated with the food product are tracked in this manner, and include farmer identification, picker or food gatherer identification, gathering basket identification, and transit shipping from one point to another, receipt of the container and food product by user, filling of a container with product, dumping a product from a container, the loss of a container and its product, and dates of time and sampling of a food product for testing, test results. The centralized ledger also provides for receiving data or notes for clarifying particular actions, for entry into a comment field associated with particular information obtained from scanning a label. In other words, the information provided in the ledger can be used to identify the source and history of the contained food product at any point in the food processing chain, for example, from an original processing

tank to a shipping drum, followed by transfer to a final retail container, such as would be the case for tracking food products suspended in liquid.

[0013] The centralized ledger can also be used to provide data points from which an accounting system can record the transformation data useful for the tracking of raw material inventory as it is converted to final product inventory. Such tracking can also include cost factors, in order to provide user companies an opportunity to ensure the accuracy of the data, and also to determine whether improvements can be made in the processing for increasing the throughput of the food processing, and reducing costs. As indicated, the system integrity is maintained through ensuring that unlabeled containers at a particular user location are labeled, and time and date stamped at a user's premises upon receipt, for showing that such containers are in the inventory of that particular user.

[0014] In another embodiment of the invention, the present system provides for issuing to a user a label maker having associated with it a unique number generator, for generating a label that uniquely identifies a particular container. In one approach, a user's account is charged every time such a label is printed. More specifically, label charges may be imposed for each printing of a label at a container manufacturer, and at user facilities during tracking of unlabeled food products, such as when pallets containing quantities of containers are re-packed, and the pallets themselves labeled.

[0015] The label would preferably comprise a scannable bar code, and below the bar code an alphanumeric depiction of the bar code. The unique number generator could also include error-checking digits as part of the bar code, so that system software can immediately determine the integrity of the number read from the label. If the

number's integrity is not verified, then a new label is printed and attached to the container. It is then scanned, with a notation of the number on the discarded label being manually inputted by an operator using the alphanumeric portion of the label.

[0016] With reference to Figure 1, a simplified block diagram is shown with a system for one embodiment of the invention. A typical user 2 of the present system and method, upon paying an initial fee to the system provider, receives a label maker 4 that includes a number generator, for imprinting scannable unique numbers or codes on the labels. The user 2 must also obtain a scanner 6, whereby the labels after application are scanned for permitting the information contained thereon to be inputted into a personal computer 10, in this example. The scanned information may be directly used by users 2 to update their inventory control for adding new containers 8 received, and for deleting containers 8 that are shipped from a user's facility to another user downstream in the system in the food processing stream. The personal computer 10 may be connected to the Internet 14 for transferring scanned information to the system provider's server computer 16, for example, for permitting the provider to update a central ledger 18 maintaining a record of all movement of the food product and associated containers through the food processing chain. In an alternative embodiment, the personal computer 10 may be connected through a modem 12 and a dedicated or a secure telephone line 13 to the server computer 16 of the provider. A plurality of users can be serviced by the system provider, as indicated by the Nth user 20. The various components shown for implementation of the system and associated method by a user 2 are not meant to be limiting, and other components or devices may be used for carrying out the methodology of the present system.

[0017] An example of one embodiment of the invention for carrying out the associated method for tracking of food products from the farm through the processing chain to the consumer and/or for tracking the processing and/or distribution of food products imported into a given country, the United States in this example, includes the following steps:

[0018] 1. Manufacturers of crop picker food gathering baskets (not shown) permanently label each basket upon manufacture with a scannable unique code or number uniquely identifying each respective basket.

[0019] 2. Manufacturers scan labels of all baskets produced to record time and date of manufacture and the manufacturer's name, and each basket is registered as being in a manufacturer's inventory, the registration being made on local databases, and in a ledger 18 maintained in a centralized database at the system provider's location for tracking all information obtained from the label scanning.

[0020] 3. Manufacturers of large shipping containers 8, including but not limited to storage tanks, flexible bag tanks, steel drums, plastic drums, bulk collection baskets, and so forth, at time of manufacture permanently label each container 8 with a scannable unique code identifying the container.

[0021] 4. Manufacturers of large containers scan all labels to register locally and in the centralized ledger the large containers' placement into a manufacturer's inventory, the date and time of manufacture, and the identity of the manufacturer.

- [0022] 5. Manufacturers of small containers 8 including but not limited to glass jars and tin cans, at time of manufacture group the containers as part of a pallet load, and label the pallets with permanent labels imprinted with a scannable code uniquely identifying the respective pallets.
- [0023] 6. Manufacturers of small containers 8 scan labels on pallets to date and time mark, and register locally and on the centralized ledger 18, the pallet loads of containers that are being placed into the associated manufacturer's inventory.
- [0024] 7. When empty large containers 8 and/or food gathering baskets are taken from a respective manufacturer's inventory for shipment to a distributor, for example, the labels on the containers and/or baskets are scanned for obtaining date and time marks for operating a personal computer 10 via a database program to produce a packing list for the shipment of the containers 8 and/or baskets, in addition to providing the scanned information for automatically reducing the respective manufacturer's inventory, and updating the central ledger 18.
- [0025] 8. When a distributor receives new large containers 8 and/or gathering baskets, labels are scanned for date and time marking the containers 8 and/or baskets, and for providing data to update the distributor's inventory, and the central ledger 18. Similarly, when the containers 8 and/or baskets are removed from the distributor's inventory for shipping to an end user, labels are scanned when loaded into the transport vehicle, for providing data indicating the date and time of shipment relative to each associated container 8 and/or basket, and for producing a packing list for the shipment, while at the same time reducing the distributor's inventory for the particular containers 8 and/or baskets shipped.

The same scanned data is provided to the server computer 16 for updating the central ledger 18.

- [0026] 9. Upon receipt of the empty containers 8 and/or baskets, the labels on the containers and/or baskets are scanned for time and date stamping, and the data is provided to update the end user packer's inventory, and the central ledger 18.
- [0027] 10. At the beginning of the food gathering process, a farmer must ensure that labels of gathering baskets received from a distributor are scanned for the date and time marking, and for recording the name of the crop picker to whom each gathering basket is provided for picking the food products, whereby the scanned data is used for updating the farmer's inventory, and for updating the central ledger 18.
- [0028] 11. When a crop picker returns a full basket of food products for a transfer to shipping containers, the basket labels are scanned for dating and time marking the receipt of a particular basket, and the data is transmitted to the server computer 16 for updating the ledger 18 to show the product gathered in each particular basket, and the identity of the farm and the crop picker associated with the food product gathered, along with any other required information.
- [0029] 12. When a full basket's food product is transferred to a larger container 8, the labeling on the basket is scanned for time and date marking the product transferred, and for including a note regarding the destination to which the large containers 8 of the food product are to be shipped. For example, the larger container may be a food processing tank that is itself labeled with date

and time markings, and scanned for providing data to the farmer's personal computer 10 for updating the farmer's inventory listing, and for transferring the data to the server computer 16 for updating the central ledger 18.

[0030] 13. Intermediate food processors may remove labeled empty drums from inventory, to a production line where the labels of the drums are scanned for date and time stamping or marking, and for obtaining data showing the number and identification of the production line, and the food product to be loaded into the associated drum. The associated computer program will then operate the intermediate processor's personal computer 10 for reducing the intermediate processor's inventory of food product and drums, as appropriate, and for supplying the data for updating ledger 18.

[0031] 14. The intermediate processor next delivers the filled drums for introduction of the contained food product onto a production line for further processing, at which time each container is labeled and scanned for time and date marking the event of so transferring the food product, for providing data for reducing the intermediate processor's inventory of food product, and for identifying the processing line associated with the next processing step. The data is also provided for updating the centralized ledger 18.

[0032] 15. If the intermediate processor is to add ingredients to the food products being processed, then previous to doing so, the intermediate processor must ensure that the containers 8 carrying the ingredients were labeled upon receipt at the intermediate processor's facility, and the labels scanned for date and time stamping or marking, updating the packer's raw materials inventory, and transmitting the associated data into the system for updating ledger 18.

Subsequent to such labeling and scanning, the ingredients and their associated containers 8 can then be moved to the processing line. After the ingredients have been added to the food products, in this example, the further processed food is delivered to containers, the container labels are scanned for showing date and time marking or stamping, and identifying the ingredients added and the source thereof, and for providing data to update ledger 18.

- [0033] 16. Samples of the food product may be randomly selected from containers 8 at any point in the food processing chain for laboratory and quality control analysis. The container 8 for each sampling has its label scanned for date and time marking, and for identifying the container from which the food product sampling was taken. The obtained data is transmitted for updating ledger 18.
- [0034] 17. The filled food product containers 8, such as drums for example, after filling, have their labels scanned for further identifying the source or sources of the associated food product, and for noting the transfer of the semi-processed food products into the intermediate processor's inventory. The scanned data is provided for updating ledger 18.
- [0035] 18. When the containers 8 of semi-processed food products are removed from the inventory of the intermediate processor, the associated labels are scanned for time and date marking, for creating a packing list, for reducing the intermediate processor's inventory of semi-processed goods, as the semi-processed food containers are loaded onto the shipping vehicle, and for updating ledger 18.

- [0036] 19. The containers are delivered to a final packer's facility, where the labels are scanned for marking upon receipt for obtaining data to update the inventory of the final packer, and for updating ledger 18. Any sampling or inspection of the food product in any of the drums is performed along with label scanning for date and time stamping or marking the drums for recording such samplings and inspections, and for updating the ledger 18.
- [0037] 20. The final packer scans the labels of the drums for date and time stamping or marking as the drums are delivered for initiating final packing of the food product. The identification number of the packing line is included with the data during scanning of the labels, for providing data for updating the inventory listing of the final packer, and for updating ledger 18, whereafter the associated drums are recorded as being removed from the semi-processed inventory of the final packer.
- [0038] 21. Empty palletized containers of glass jars, for example, are introduced to the final packing line via scanning of labels for dating and time marking. This scanned data is provided for reducing the final packer's inventory of packaging material, and for updating ledger 18.
- [0039] 22. The glass jars, in this example, are inkjet coded at the time of filling with food product via the final packing line, and filled and closed. The inkjet coding will include information permitting tracking via the ledger 18 of the food product contained therein back, through all of the chain of food processing, to the farm.

- [0040] 23. After the jars have been packed with the food product, such as olives and olive oil, for example, the jars are packed in appropriate cartons, and palletized. After a pallet is completely packed with cases of the processed product, a label is created from the label maker 4 with a unique number printed thereon for identifying the pallet, and the time and date marking. The label is scanned, and the data obtained is used to update ledger 18. At this point in the processing, the ledger will show all of the codes of all of the jars located on the associated pallet. The scanned data is also used by the final packer for updating his inventory of packed and palletized processed food product to show an appropriate increase therein.
- [0041] 24. When the pallets of end-processed food products are removed from inventory for shipping, the labels on the pallets are scanned with date and time stampings and scanned for obtaining data for creating a packing list, reducing the inventory of the final packer, and for updating ledger 18. The final product inventory of the final packer is thereby reduced.
- [0042] 25. At this point, the computerized system stores via ledger 18 the historical tracking from the farm originating the food products, to the packaging of the food products in individual containers, for permitting tracking of the food products through the entire food processing chain. Accordingly, a consumer by merely identifying the product purchased via the inkjet code on the glass jar, in this example, can utilize this code for tracing the food product back through the food chain to the farm, as indicated. The unique numbering and/or coding system utilized by the present invention permits accurate tracing or back tracking of all events associated with the food product from the farm through to delivery to the consumer.

[0043] 26. P2P (Peer-To-Peer) programming is used in one embodiment of the invention to correlate different databases that may be used by participants in the present tracking process. The process requires its use throughout the entire product processing steps, including use of the unique numbering system printed on labels applied to containers, pallets, drums, and so forth.

[0044] Although various embodiments of the invention have been shown and described herein, they are not meant to be limiting. Those of skill in the art may recognize certain modifications to these embodiments, which modifications are meant to be covered by the spirit and scope of the appended claims. For example, the methodology of the present invention has been described and illustrated in association with tracking food products that may be suspended in liquid, or in which the food products themselves may be liquid. However, the present method and system for tracking food products is not meant to be so limited, and can with alteration be applied for use for tracking food products that are otherwise packaged.